

WHAT IS CLAIMED IS:

1. An end surface reflection type surface acoustic wave device comprising:
 - a piezoelectric substrate having two opposing end surfaces on which a surface acoustic wave is reflected;
 - an electrode film made of at least one of Al and an alloy including Al as a major component on said piezoelectric substrate and which defines at least one interdigital transducer; and
 - an insulating film arranged on said piezoelectric substrate so as to cover said electrode film; wherein
 - a top surface of the insulating film is planarized, and a ratio of the average density of said electrode film to the density of the insulating film is less than or equal to about 1.5.
2. An end surface reflection type surface acoustic wave device according to Claim 1, wherein said insulating film is made of SiO_2 .
3. An end surface reflection type surface acoustic wave device according to Claim 1, wherein said piezoelectric substrate is made of at least one of LiTaO_3 and LiNbO_3 .
4. An end surface reflection type surface acoustic wave device according to Claim 2, wherein said piezoelectric substrate is made of at least one of LiTaO_3 and LiNbO_3 .
5. An end surface reflection type surface acoustic wave device according to Claim 2, wherein, when the wavelength of the surface acoustic wave is denoted as λ , the film thickness Hs/λ of said insulating film made from SiO_2 is in the range of about 0.15 to about 0.40.

6. An end surface reflection type surface acoustic wave device according to Claim 1, wherein said electrode film defines one interdigital transducer and is a surface acoustic wave resonator.

7. An end surface reflection type surface acoustic wave device according to Claim 1, wherein said end surface reflection type surface acoustic wave device is one of a resonator-type filter, a ladder-type filter, and a lattice-type surface acoustic wave filter.

8. An end surface reflection type surface acoustic wave device according to Claim 1, wherein said end surface reflection type surface acoustic wave device is a one-port-type surface acoustic wave resonator.

9. An end surface reflection type surface acoustic wave device according to Claim 1, wherein the piezoelectric substrate is a 36° rotated Y-plate X-propagation LiTaO_3 substrate.

10. An end surface reflection type surface acoustic wave device according to Claim 1, wherein the piezoelectric substrate has a substantially rectangular shape.

11. An end surface reflection type surface acoustic wave device according to Claim 1, wherein the piezoelectric substrate includes sides having step differences at a position of a middle height.

12. An end surface reflection type surface acoustic wave device according to Claim 11, wherein portions of the sides above the step differences define reflection end surfaces.

13. An end surface reflection type surface acoustic wave device according to Claim 12, wherein the reflection end surfaces extend substantially parallel to each other and are planarized surfaces.

14. An end surface reflection type surface acoustic wave device according to Claim 11, wherein portions of the sides below the step differences have roughened surfaces.

15. An end surface reflection type surface acoustic wave device according to Claim 1, wherein the at least one interdigital transducer includes a pair of comb electrodes.

16. An end surface reflection type surface acoustic wave device according to Claim 1, wherein the at least one interdigital transducer is made of Al.